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EXPERIMENT STATIONS

SEASON 1954-55

ADEN PROTECTORATE

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ADEN PROTECTORATE
ABYAN COTTON EXPERIMENT STATION
PROGRESS REPORT FOR THE SEASON 1954-55

BY

R. R. ANSON.

Introduction.

Planting Dates.	*Picking Dates.*	*Close Season.*
Mid August to mid October.	January to May.	June to mid August.

Meteorology.

In the hills the monsoon rains broke early and persisted for longer than usual, resulting in a record amount of water passing down the Wadis Bana and Hassan. At the head works some 280,000,000 cubic metres were registered this season while, for the same period last season, the amount registered was 178,000,000 cubic metres.

Although a considerable amount of water was diverted on to the land and irrigated a larger area than usual, much of it broke through the "Ogmas" and found its way to the sea, taking with it a quantity of silt and washing away substantial portions of the banks from each of the respective wadis.

This phenomenon was not peculiar to the Abyan Delta but also affected many other outlying districts, enabling them to plant cotton on areas which had not grown it before and resulting in the largest aggregate so far produced by the Scheme.

In the Abyan Delta the standard of cultivation was below average; much of the cotton was sown on a poor seed bed, hurriedly and badly prepared or not prepared at all and, in addition, a considerable area occupied land which had without rest or rotation grown cotton for three or more consecutive years. Consequently wilt was more severe and germination poorer than usual. If this system of growing continuous cotton on the same land is pursued, it is likely to bring about considerable deterioration in both yield and grade. Thus the fall in yield and grade on the Abyan Scheme this season may to a certain extent be attributed to these factors but, it is thought, the

primary cause was climatic, in that continuous dust laden wind in January, followed by prolonged overcast conditions in the early part of February, delayed the opening of the lower and middle bolls and created a condition which caused the whole crop of bolls to open in one flush. This meant that pickings, which would normally be made separately, were, of necessity, mixed, thereby lowering grade and causing the crop to close down quicker than usual.

On the Research Farm, where a system of crop rotation has been introduced, the cotton crop was well up to average in both yield and grade although, here again, wilt was more severe than usual. It is, however, interesting to note that no wilt was found on cotton occupying land which had not been cropped with cotton for the previous three years.

Crop Prospects.

Cotton seed issues were sufficient for sowing 45,000 acres. This seed covered the requirements not only of the Abyan Delta but also of the smaller independent areas of Lahej, Dathina, Al Wathia, Lodar, Yeramis, Ahwar and Wahidi. The fact that these areas are so widely separated and difficult to cover makes it almost impossible to estimate accurately the total area under crop. The original estimate of effective area under crop was put at 41,000 acres and this total was arrived at as follows.

	Original Estimate	*Revised Estimate*
Abyan Delta	27,000 acres	21,000 acres
Yeramis	1,000 ,,	800 ,,
Lahej	6,000 ,,	5,000 ,,
Dathina	3,400 ,,	2,500 ,,
Al Wathia	1,800 ,,	1,500 ,,
Ahwar	1,200 ,,	1,200 ,,
Lodar	400 ,,	400 ,,
Wahidi	200 ,,	100 ,,
Total	41,000 acres	32,500 acres

The estimated yield in bales of 380 lb. is now put at 32,000*, and the lint will probably bulk in grade 4. Owing to seasonal vicissitudes already described there will be a very small proportion of grades 1 and 2. At the time of writing (end of April) seed cotton sufficient for manufacturing 12,000 bales has been purchased.

*Late pickings did not come up to expectations and the final crop was only 24,545 bales.

Seed Issues.

All sowing seed was well sunned and treated with "Perecot" dust before distribution. This was done as a precautionary measure against pink bollworm and bacterial blight.

Pure seed bulked at Yeramis was given out to Halima and to most of the Giar farmers. Yeramis received a new wave of selected seed drawn from the breeding plots and bulked in isolation; the remaining areas were given ordinary commercial seed collected from grades 1 and 2.

Cultivators, searching for some excuse other than bad husbandry to account for the bad stands some of them obtained, blamed the seed dusting technique, but periodical germination tests made at the seed distributing station showed nothing lower than 84%, and most tests averaged 93%.

Cotton Breeding and Propagation.

Nucleus Bulking Area.

An area of 10 acres taken from a nearby farmer was sown with seed made up from original bulk selections (AB-1). In the centre of this 10 acre field, 2 acres were planted with AB-2 (bulked filter from AB-1). This 2 acre core carried yet another comprising 12 rows of AB-3 (bulked filter from AB-2). The following yields were obtained:—

AB-1	8 acres	Averaging	2,056 lb. seed cotton per acre.
AB-2 + AB-3	2 acres	,,	2,004 lb. seed cotton per acre.

A further bulking of AB-3 was made on an isolated plot measuring 0·877 acre, which yielded 2,373 lb. seed cotton per acre. It has provided seed sufficient for sowing a 100 acre bulking area at Yeramis next season. The G.O.T. is 35·35%, which compares favourably with the control 35·92%. The lint is considered slightly longer and more regular. The remaining areas in Yeramis will be sown with AB-1 seed produced from the 10 acre field, while Yeramis, supplemented by seed selected from grades 1 and 2 at Halima and Giar, should provide enough pure seed to cover all requirements both in the Abyan Delta and elsewhere.

Other Varieties.

Substantial quantities of self bred seed have been propagated from all other varieties under test.

This seed will be kept for future testing. BAR XL-1, which has done so well in the varietal tests, will be bulked in isolation against possible demands.

One hundred and fifty hybrids between Wilds Early and 1730A were backcrossed to 1730A with the object of obtaining a wilt resistant strain of 1730.

Cotton Varietal Tests.

These tests comprised 10 replications of 10 varieties. They were planted on an excellent seed bed and occupied land which had previously grown pigeon pea (*Cajanus*). Water was much lighter than usual but germination was good. There were some severe patches of wilt (*Rhizoctonia*) which greatly depressed the yields of susceptible varieties. It might be as well to mention that the two American type varieties (Wilds Early and BAR 12/3) have not yielded as well this season as they did in 1953-54 because they were not given closer spacing and the second crop did not come to much because of the light initial watering. Relevant data are given in Table 1.

TABLE 1.

ABYAN COTTON VARIETAL TRIAL, 1954-55.

Variety	% *G.O.T.*	*Seed cotton yields*		*Corresponding lint yields*	
		lb. per acre	*% of Control*	*lb. per acre*	*% of Control*
BAR XL-1	36·7	2,659	119	978	120
AB-3	38·6	2,355	105	909	112
AB-Control	36·8	2,236	100	814	100
AB-1	36·6	2,130	95	771	95
BAR XL-3	37·1	2,108	94	782	96
Wilds Early	35·0	1,981	88	694	85
BAR 12/3	31·0	1,943	87	605	74
Karnak	35·2	1,641	73	578	71
AB-2	36·3	1,487	66	534	65
Dom. Sakel	34·0	1,327	59	452	55
S.E.		± 214		± 78	

Counts made in the varietal tests during mid January gave the following percentages of wilt infected plants per variety.

Variety	% *plants infected*
Wilds Early	0·32
BAR 12/3	1·53
BAR XL-1	2·83
AB-3	4·05
AB-Control	5·62
AB-1	5·63
Karnak	5·70
Dom. Sakel	8·86
BAR XL-3	12·52
AB-2	16·91

Cotton Pests and Diseases.

Sudan Bollworm (*Diparopsis perditor*).

Attacks from this pest were severe at Ober Othman and in some fields at Zingibar. It is known to pupate in the soil and may best be controlled by crop rotation, deep ploughing by means of which the pupa is exposed to the sun, or by flooding.

The practice of growing cotton continuously on the same land is likely to encourage infestation.

American Bollworm (*Heliothis armigera*).

Sporadic attacks were experienced throughout the Scheme and some parts of Lahej were infected, but plants eventually recovered and formed a second crop of bolls. American bollworm has many alternative hosts and is for this reason difficult to control.

Army Worm.

Colonies of army worm were noticed in various patches throughout the Scheme and did some damage; fortunately the damage was very local.

Other crop pests were present but in numbers small enough to render damage done by them very small.

Wilt (*Rhizoctonia*).

This was much more in evidence than in any other season. In badly infected areas loss of crop must have amounted to between 15 and 20 per cent. This disease is caused by fungi which live in the soil; it is likely to increase each season unless some form of rotation or fallow is adopted. Pamphlets, translated into Arabic and explaining the cause and recommending remedies to combat the disease, were sent to the Secretary of the Lower Yafai Farmers Association for distribution amongst peasants.

Other Diseases.

Leaf spot (*Cercospora gossypina*) and leaf rim blight (fungi) were much less severe this season and no symptoms of bacterial blight (*Xanthomonas malvacearum*) were discovered.

Sorghum Varietal Tests.

The field on which these tests were carried out had previously grown cotton. A good seed bed, prepared by the Ferguson rotovator eight days after watering, was planted on 5th September by hand. The spacing and thinning technique was similar in all respects to that of last season. Plots were long and narrow and there were six replications.

In comparison with the 1953-54 season, growth was poor and the final yield of grain and fodder disappointing. Birds, mostly finches and weaver birds, made a nuisance of themselves. They showed marked preference for Beni and did not appear very partial to Dwarf Hagari.

Two crops of sorghum were produced in the season, one annual and one ratoon. At the 5% level in the annual crop there were no significant differences between varieties either in yields of grain or in yields of fodder per acre. However, in the cumulative totals of the annual and ratoon crops the grain yields of Dwarf Hagari were significantly higher than those of either of the other varieties. There were no significant differences in yields of fodder per acre. Results of the experiment are shown in table 2.

TABLE 2.

SORGHUM VARIETY TRIAL.

Cumulative totals of annual and ratoon crops.

EUROPEAN METHOD OF SOWING.

Variety	*Grain yields lb. per acre*	*Fodder yields lb. per acre*
Dwarf Hagari	1,996	7,949
Zaar	1,420	7,969
Beni	1,113	7,463
S.E. =	± 116	

NATIVE METHOD OF SOWING.

Variety	*Grain yields lb. per acre*	*Fodder yields lb. per acre*
Dwarf Hagari	1,172	4,143
Zaar	1,303	7,540
Beni	1,103	10,628

In the trials planted by the native method, poor germination due to ineffective watering nullified the usefulness of the experiment and rendered the results incomparable. Inspection plots depicting various methods of soil preparation and sown adjacent to each other gave the following results. (Local Beni seed was sown in each plot).

	Yield Grain lb.	*Yield Fodder lb.*
(1) Rotovated and sown by tractor planter	1,967	12,530
(2) Rotovated and sown by native plough	1,999	16,082
(3) Tine harrowed and sown by tractor planter	1,906	12,996
(4) Tine harrowed and sown by native plough	1,579	15,736

Other Crops.

Chillies (*Capsicum frutescens*).

A pungent variety grown as a field crop and irrigated at regular intervals yielded 6·08 tons per acre green weight, 1·21 tons per acre dry weight. The green chillies find a ready market in the native bazaars but owing to the small quantity used by individuals it would not take much to saturate it. There should be no difficulty in finding an export market for the dry product but it remains to be seen whether or not the price would be sufficient to make chillies an economic proposition if grown on a large scale.

Tomatoes.

Seed specially selected from good stock was sown in seed beds towards the end of September and seedlings were staked out in the field about mid October. Regular irrigations were given and in order to prevent excessive vegetative growth all laterals were periodically nipped off.

The season was not particularly suitable for tomato growing because, owing to intense heat, it was impossible to get the crop planted out earlier and consequently it closed down early, but in quality the fruit was excellent. The crop yielded 9·67 tons per acre.

Castor Oil (*Ricinus communis*).

Four observation plots of four varieties were grown as a field crop. The seed, spaced at 1½ metres between rows and 1 metre within rows, was sown on 30th August on a good seed bed and germinated well. Plants were later thinned to one per hill. Growth was luxuriant and the average height was roughly 8 feet. Terminals were cut off when seedlings reached 3 feet in height. This was done to discourage spindly growth and to facilitate picking. The following weights per acre of pods and cleaned seed were obtained.

Variety	*Weight of pods*	*Weight of clean seed*
1. Nadid	429 lb.	201 lb.
2. Hindi (12)	1,001 „	671 „
3. Kageln (Black)	487 „	288 „
4 Kageln (Spotted)	599 „	355 „

The present price of clean seed is in the region of £45 per ton.

Papaws (*Passifloraceae*).

A small area (½ acre) of papaw seed imported from India was sown in seed beds in June, and seedlings were planted out in August. It is now producing a heavy crop of remarkably good fruit.

Tube Wells and Vegetable Gardens.

In addition to the garden at Giar where, for the past three seasons, various fruit and vegetable crops have been under trial, four more areas have been taken over by this Section. These include the garden at Kod, formerly the property of the late Sultan Hussein, and three undeveloped areas surrounding new tube wells. Before any cultivation could be done, all four areas had to be levelled and provided with suitable canals, a fact which added greatly to the work of this Section. Head gardeners, most of whom were trained at Giar, were installed on each site (Bagidar, Joel, Samna). Tobacco, grain, fodder, vegetable and fruit crops have now been established and these gardens might well form a training centre for would-be enthusiasts; the nucleus of a small industry of which Aden has been in need for many years.

Conclusions.

Cotton.

Some form of crop rotation or fallow should be introduced in order to prevent a drastic reduction in both yield and grade.

All farmers should be encouraged to prepare their land more thoroughly before planting and discouraged from growing larger areas than they are able to cope with efficiently.

In many instances a reduction in the size of field would ensure better watering and less surface erosion.

Seed selection has given promising results and all districts in which the new wave of pure seed was grown gave a better grade and a more regular staple.

Fruit and Vegetables.

Bananas, papaws, lucerne, chillies, onions and tomatoes can be grown profitably under irrigation.

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